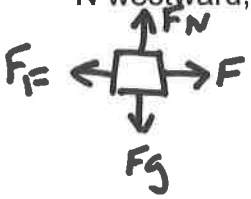
$F_{net} = F - F_f$

1. A jet plane accelerates horizontally with the thrust of the engines increasing to 50,000 N eastward at a time when air resistance (drag) acting on the 4000 kg plane amounts to 30,000 N westward, what will be the plane's acceleration?



$F_{Net} = ma$

$F - F_F = ma$

$50{,}000 - 30{,}000 = 4000a$

$20{,}000 = 4000a$

$a = \frac{20{,}000}{4000} = 5\ m/s^2$

2. A force of 36 N gives one mass (m_1) an acceleration of 4 m/s^2. The same force gives a second mass (m_2) an acceleration of 12 m/s^2. What acceleration will this force give to the two masses if they are fastened together?

$F = ma$

$\therefore m = F/a$

$m_1 = \frac{36}{4} = 9\ kg$

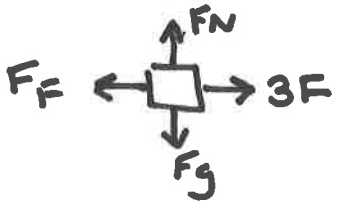
$m_2 = \frac{36}{12} = 3\ kg$

$F = (m_1 + m_2)a$

$36 = (9+3)a = 12a$

$a = \frac{36}{12} = 3\ m/s^2$

3. A car is being pushed forward by three ingenious physics students. They know the force of friction of the car is approximately 320 N. If the car's sticker says it has a mass of 1040 kg, and it is accelerating forward at a rate of 1.2 m/s^2, what force are each applying if they are applying equal forces?



$F_{x\,net} = ma$

$3F - F_F = ma$

$3F - 320 = 1040(1.2)$

$3F = 1248 + 320$

$F = \frac{1568}{3}$

$F = 523\ N$

4. A 1200 kg car is traveling East at a <u>constant speed</u> of 25 m/s. What is the net force acting on it?

$F_{Net} = 0$

5. My car accelerates from 0 to 18 m/s in 3.2 seconds. If the mass of my car is 2450 kg and the force of friction is 3,900 N, what is the force produced by my car's engine?

$V_i = 0$

$V_f = 18$

d

a ?

t 3.2

$V_f = V_i + at$

$18 = 0 + a(3.2)$

$a = 18/3.2 = 5.625\ m/s$

$F_{Net} = ma$

$F - F_F = ma$

$F - 3900 = 2450(5.625)$

$F = 13781 + 3{,}900$

$F = 17{,}681\ N$

1) 5.0 m/s^2 (2) 3.0 m/s^2 (3) 523 N (4) too easy (5) 17,700 N